



BUILDING ENERGY SAVING ORDINANCE (BESO)

DECEMBER 7, 2016

Findings through Nov. 2016



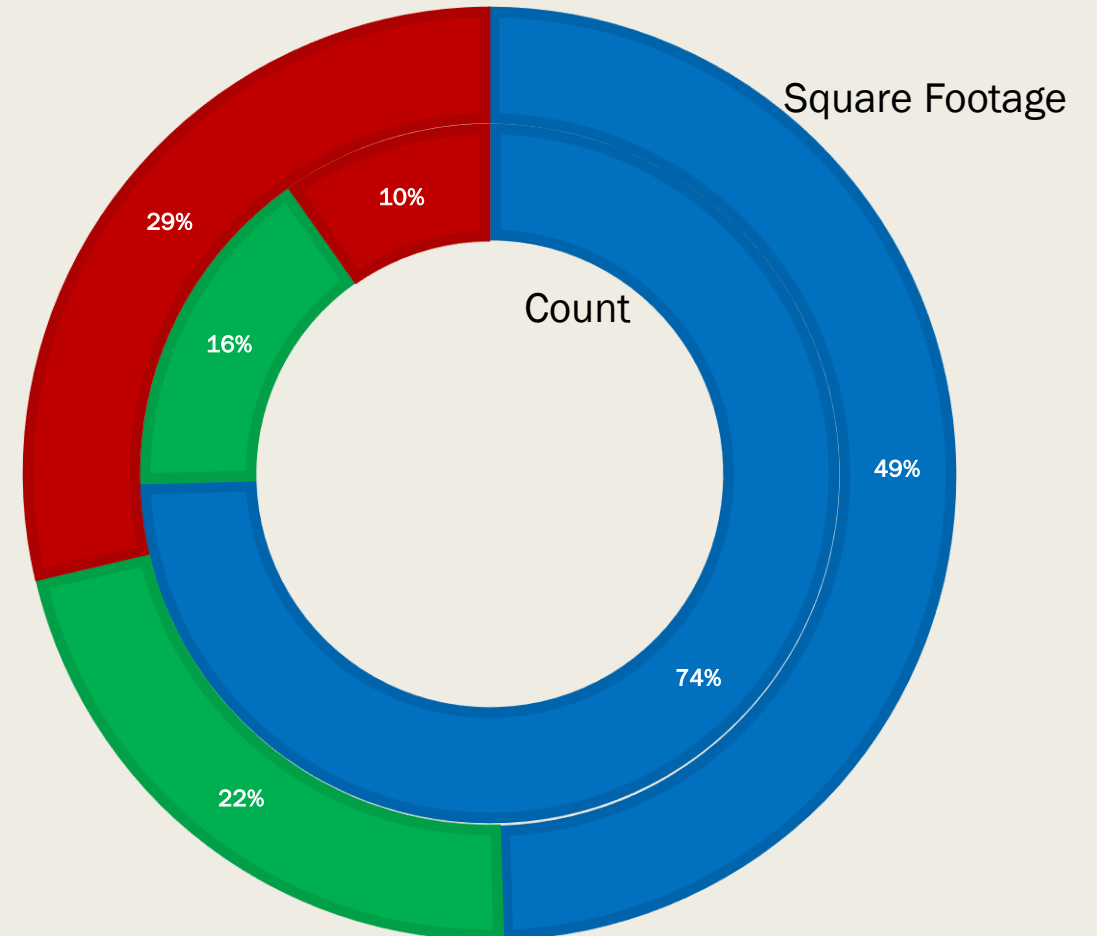
BESO Basics

- Update to RECO/CECO requiring tailored energy assessment at time of sale or periodically, based on building size
- The BESO process should be:
 - *EASY*
 - *AFFORDABLE*
 - *VALUABLE*
- Home Energy Score required for homes at time of sale or within 12 months.
- Exemptions for high performing buildings

Berkeley Building Stock

■ Single Family ■ Multifamily ■ Commercial

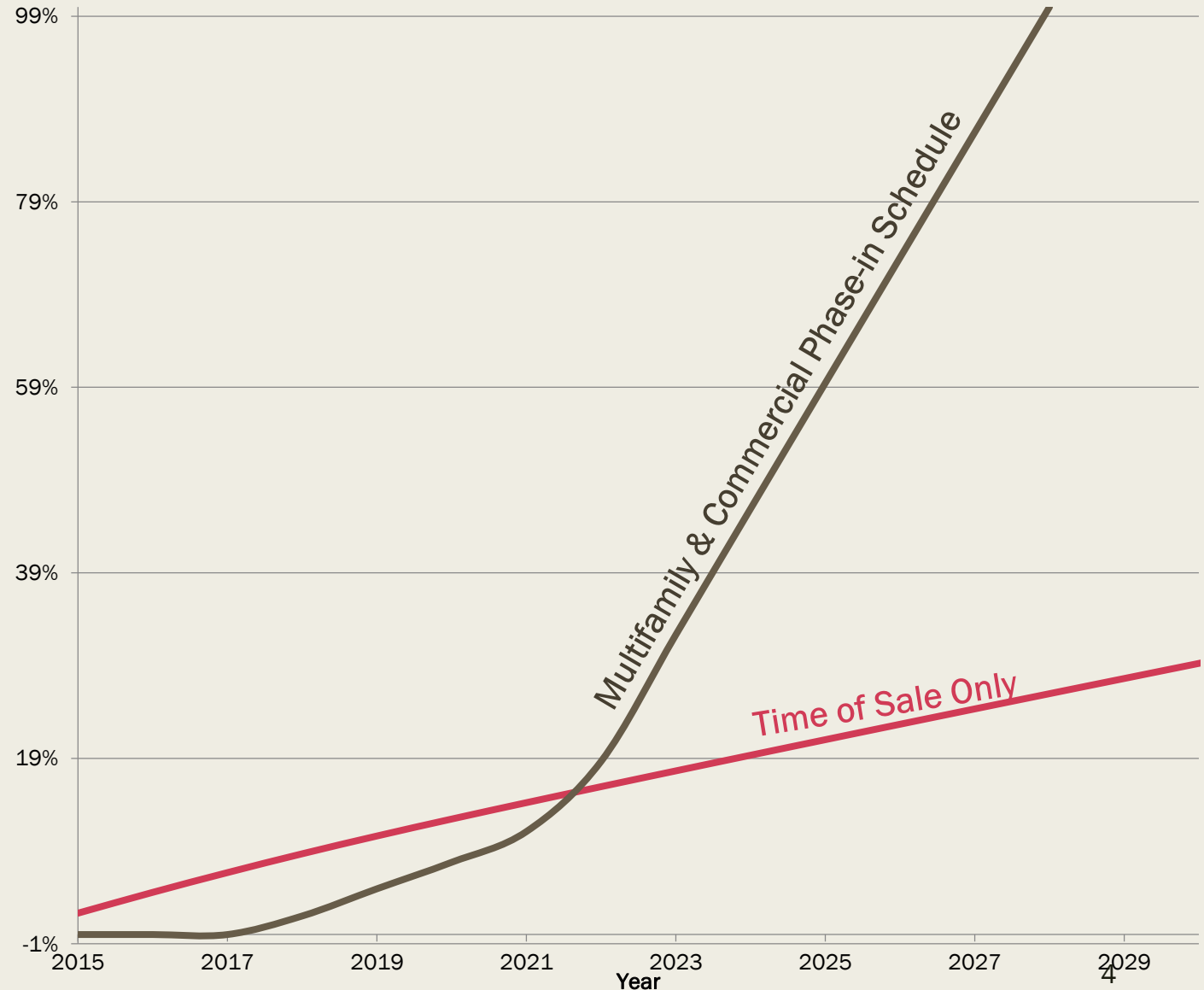
- Approx. 30,000 buildings total
- 21,000 single-family
 - 49% of square footage
- 4,400 multifamily
 - 22% of square footage
- 2,800 commercial & mixed-use
 - 29% of square footage



BESO Compliance – Year 1

- 921 single-family
 - 4% of total stock
- 108 small/medium
 - 61 multifamily
- 43 commercial

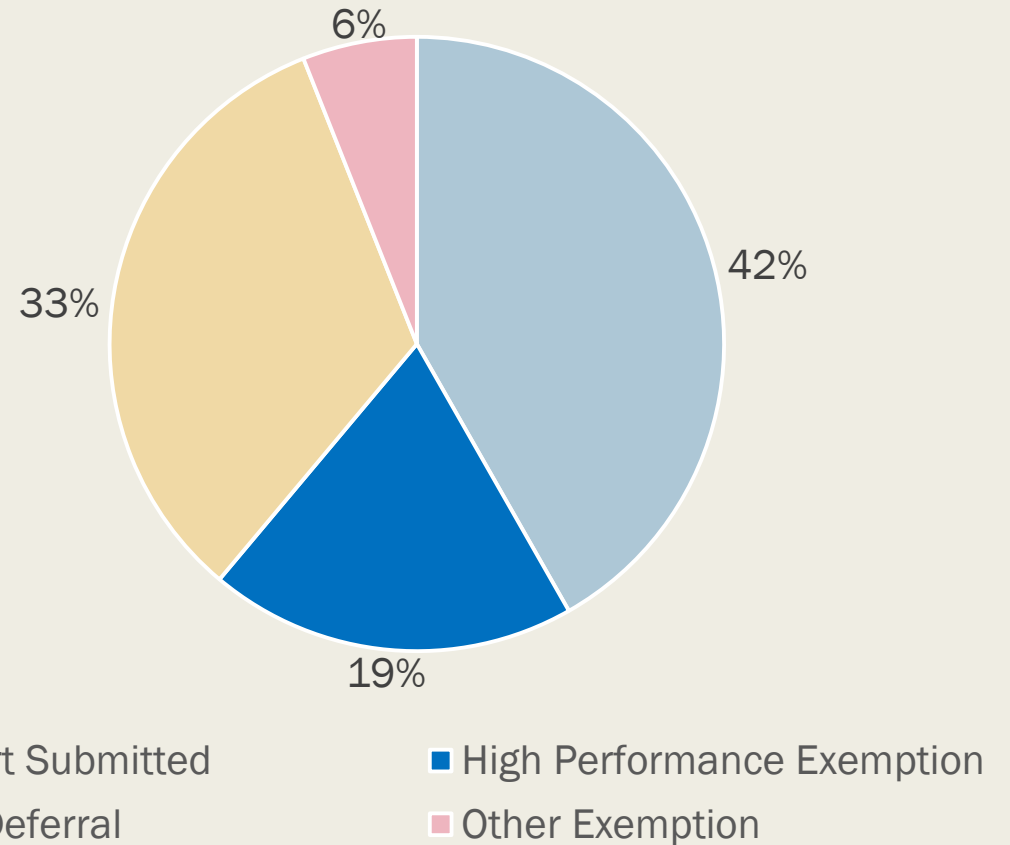
Total Buildings under BESO Compliance



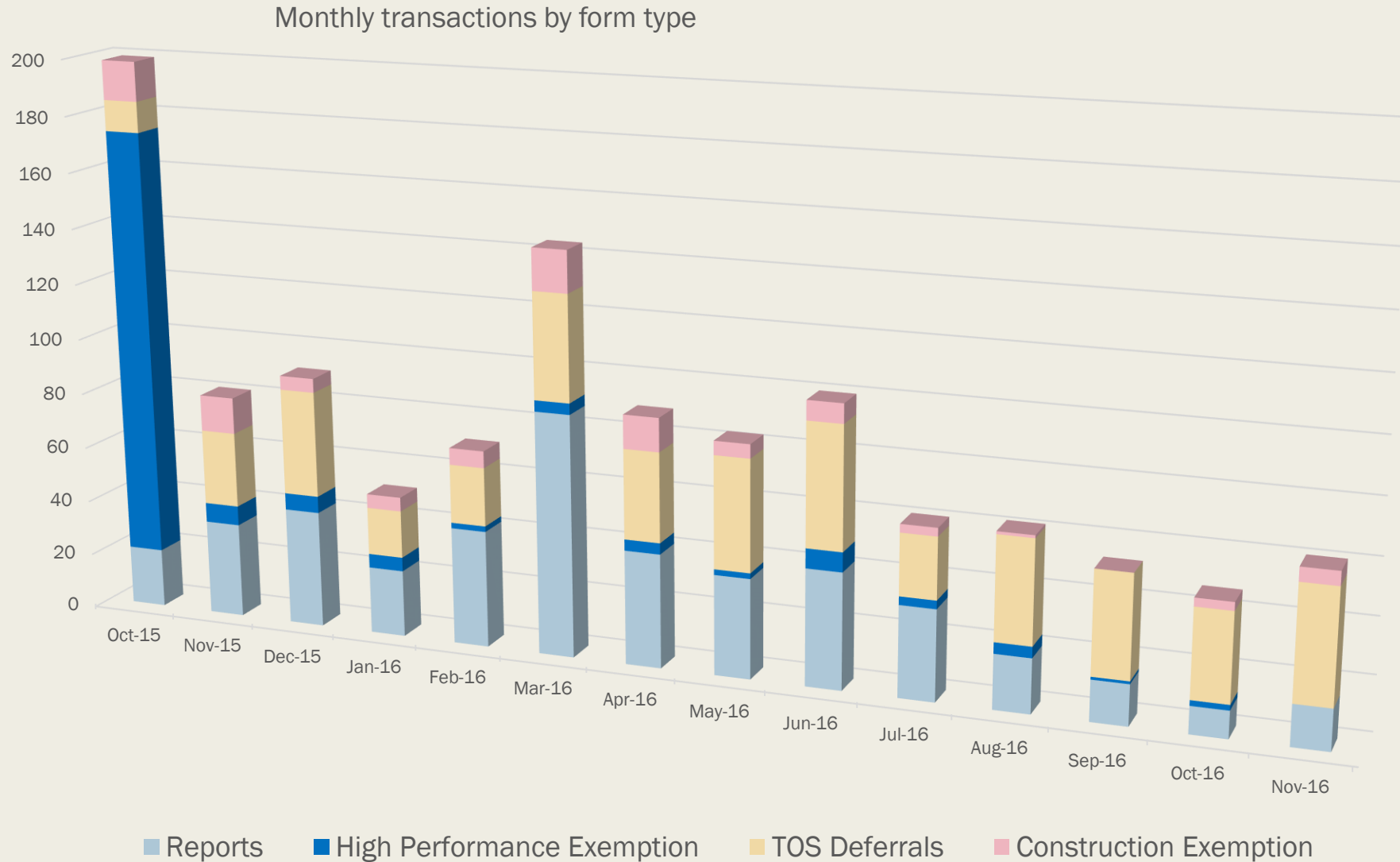
BESO Basics

- 712 buildings are fully compliant
 - *198 qualify as high performance*
- 338 buildings have active one-year deferrals

Breakdown of Compliance Types



Time of Sale Trends



Enforcement Process

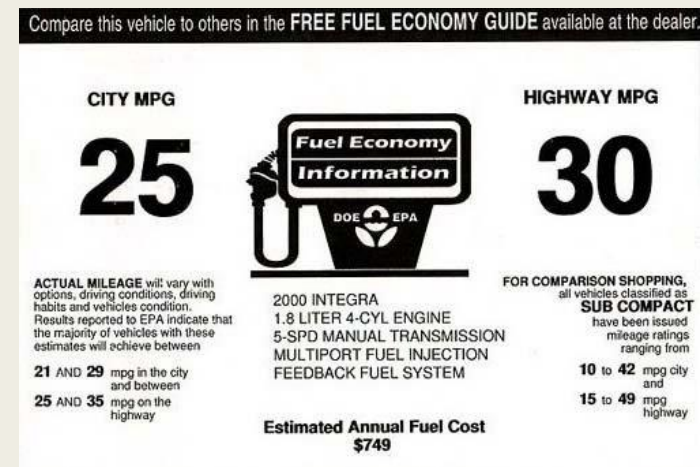


- 14% of buildings receive Courtesy Letter
- 57% comply after Courtesy Letter; 99% after Notice of Violation
- 5 buildings pending citations
 - *Citation fee of \$200, max of \$1000*

The Home Energy Score

HEScore Basics

- DoE program created to allow comparison of estimated energy use between homes on a 1-10 scale
- Each score corresponds to a range of energy uses, adjusted for climate. Homes are compared to a national average, not a reference home of similar size.
- Easy to produce; takes less than an hour



HEScore Cover

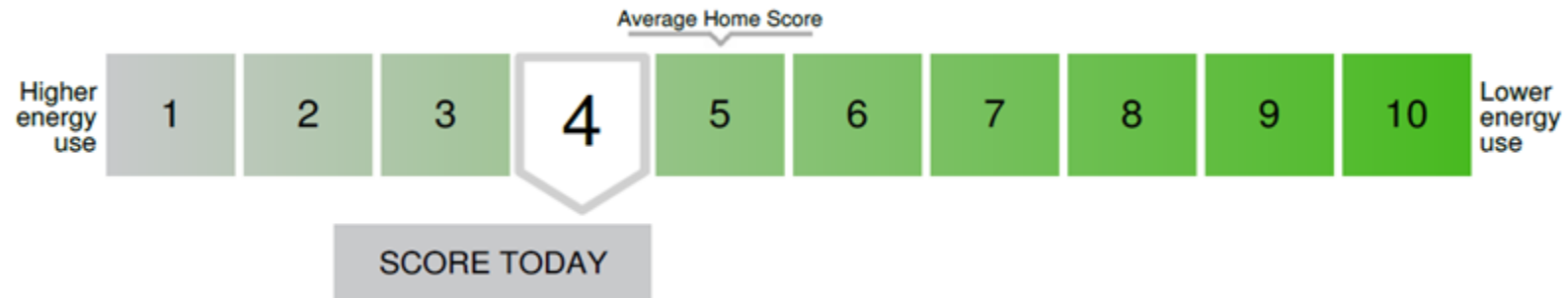


Home Energy Score

YEAR BUILT: 1970
CONDITIONED FLOOR AREA: 1450 FT²

2120 Milvia Street
Berkeley, CA 94704

SCORE TODAY **4**



The U.S. Department of Energy's Home Energy Score assesses the energy efficiency of a home based on its structure, heating, cooling, and hot water systems. For more information visit HomeEnergyScore.gov.

2120 Milvia Street
Berkeley, CA 94704

SCORE
TODAY

4

Home Facts

The Home Energy Score's Home Facts includes details about the home's current structure, systems, and estimated energy use. For more information about how the score is calculated, visit our website at HomeEnergyScore.gov.

About This Home



ASSESSMENT

Type	Official
Assessor name	CA-SWST-0035
Scoring tool version	v2015

HOME CONSTRUCTION

Year built	1970
Number of bedrooms	3
Stories above ground level	1
Interior floor-to-ceiling height	8 ft
Conditioned floor area	1,182 ft ²
Direction faced by front of house	East
Air sealed?	No

Estimated Annual Energy Use



ENERGY BY TYPE

Total	119 MBtus
Score basis	62 MBtus
Electricity	5,573 kWh
Natural gas	564 therms

COST BASIS

Electricity	\$0.162 / kWh
Natural gas	\$0.992 / therm
Energy cost per square foot	\$1.24 / ft ²

DEFINITIONS & CONVERSIONS

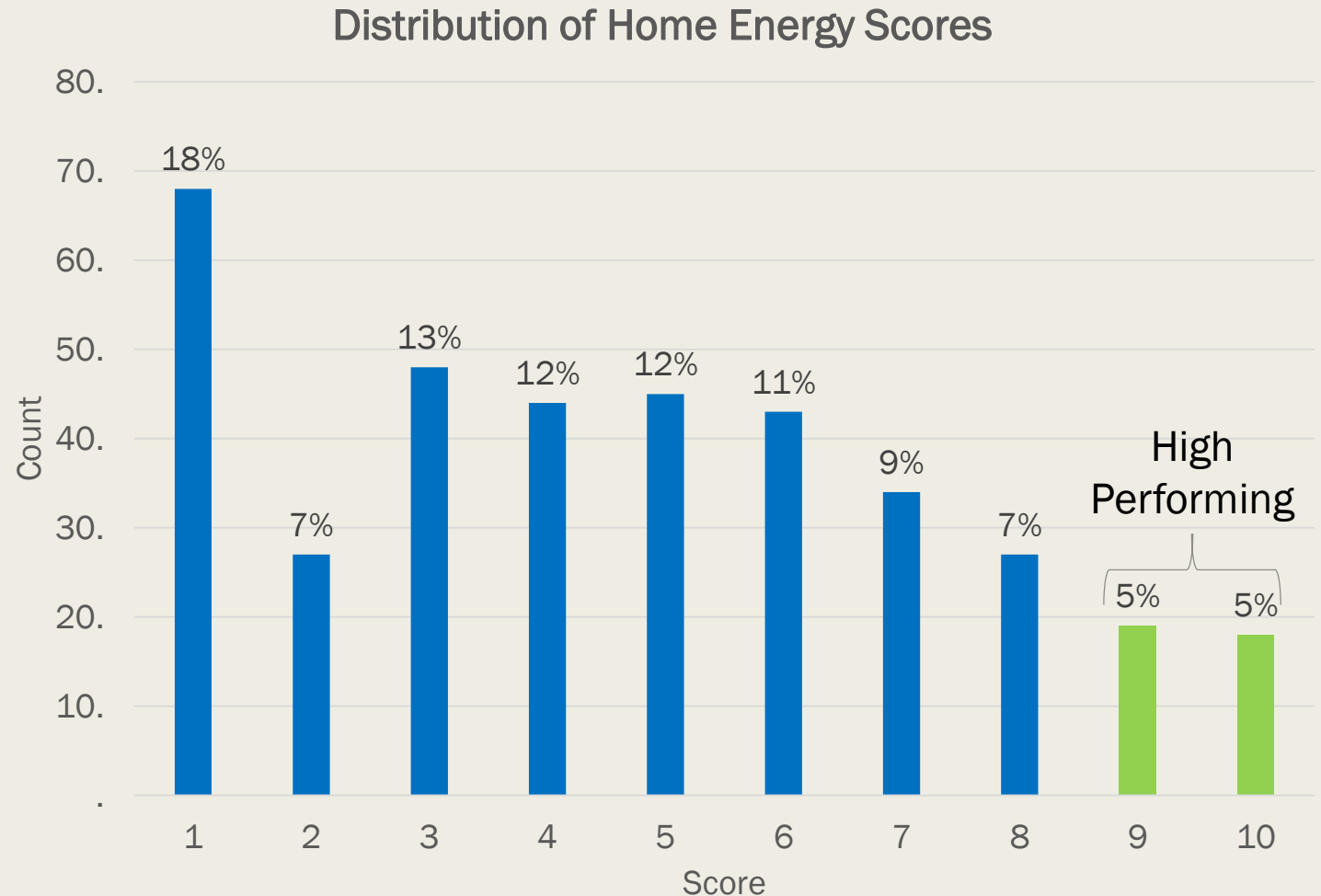
MBtu	Million British thermal units; generic energy unit
kBtu	Thousand British thermal units; generic energy unit
kWh	Kilowatt-hour; electricity unit
Therm	100,000 Btu; heat energy unit
Electricity conversion	1 MBTU = 293 kWh
Heat conversion	1 MBTU = 10 therms

Recommendations

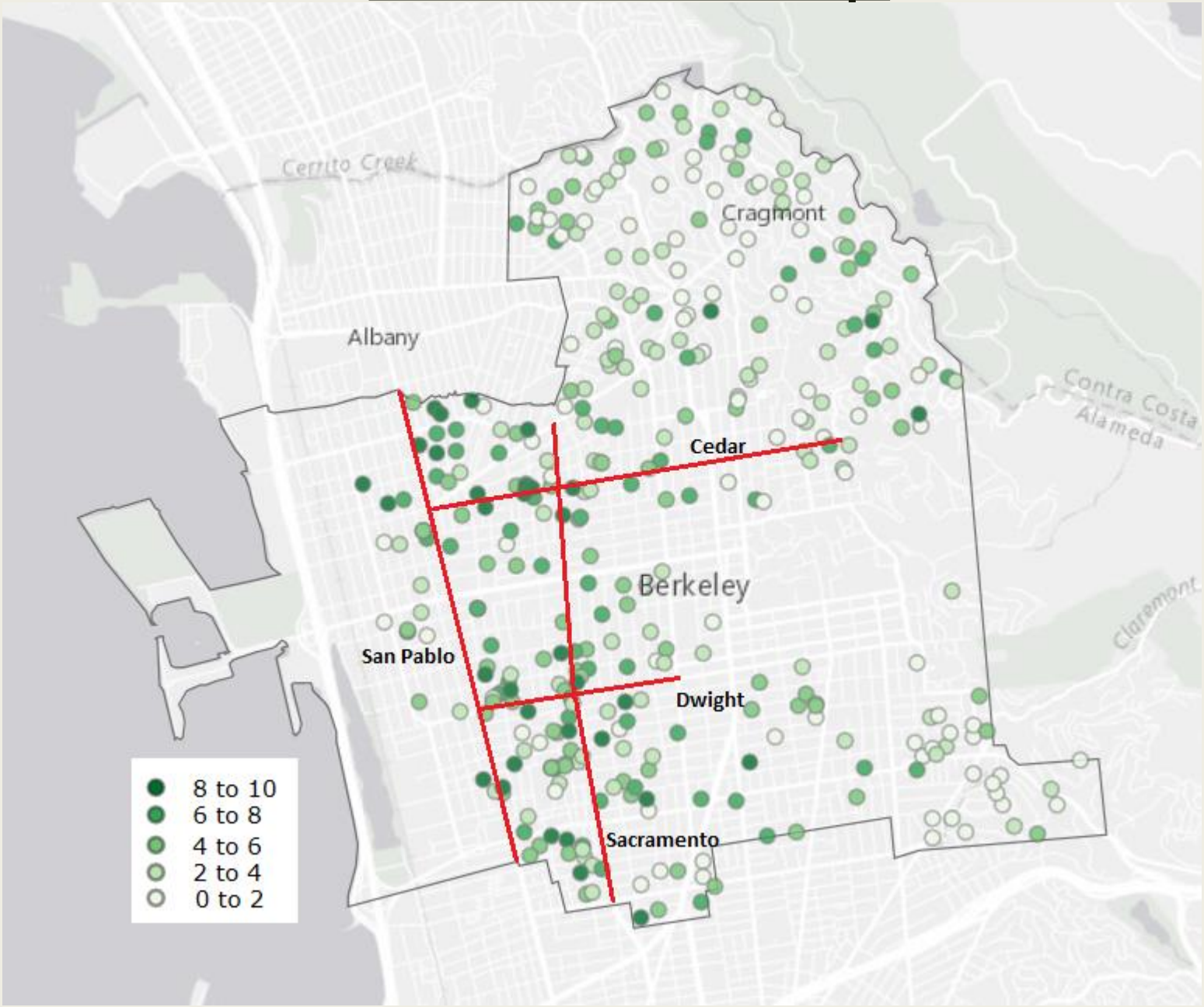
	RECOMMENDED MEASURE	RECOMMENDATION DETAILS	GENERALLY RECOMMENDED IF
✓	Attic Insulation & Air Sealing	Insulation $\geq R-30$ ($\geq R-38$ in climate zones 1 & 11-16)	Existing average $\leq R-11$ and accessible attic exists
	Wall Insulation	Insulate $\geq R-13$	Existing =R-0
✓	Floor Insulation	Insulate $\geq R-19$	Existing =R-0 and accessible crawlspace exists
	Whole Building Air Sealing	$\geq 15\%$ leakage reduction from vintage table defaults	Homeowner experiences drafts
	Duct Repair	Repair may include sealing, insulating, or replacement. See Additional Comments for more information.	Visual inspection reveals duct leakage
✓	Central Gas Furnace	$\geq 92\%$ AFUE	Unit ≥ 15 years old and AFUE $\leq 80\%$
	Central Air Conditioner	≥ 15 SEER / 12.7 EER	Unit ≥ 15 years old and SEER ≤ 10
	Gas Storage Water Heater	EF ≥ 0.67	Natural gas unit ≥ 10 years old
	Gas On-Demand Water Heater	EF ≥ 0.82	Customer requests tankless
	Natural Gas Wall Heater or Ductless Heat Pump	$\geq 70\%$ AFUE (wall heater) ≥ 8.5 HSPF / ≥ 15 SEER (heat pump)	Unit ≥ 15 years old
	Fireplace Door and/or Damper	Sealing fireplace	Not existing
	Pool Pump	Variable speed	Single speed

Home Energy Score Basics

- 431 assessments performed so far
- Average score 5
- 62% below 6; contacted by Upgrade Advisor
 - 66 contacted
 - 23 active or complete upgrades

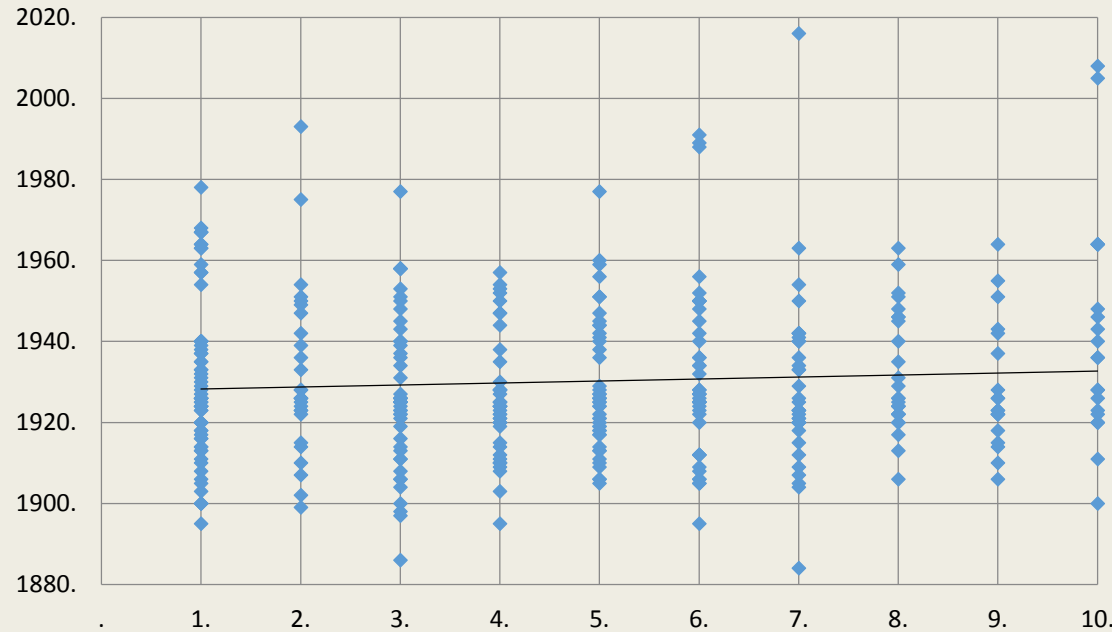


HEScore Map

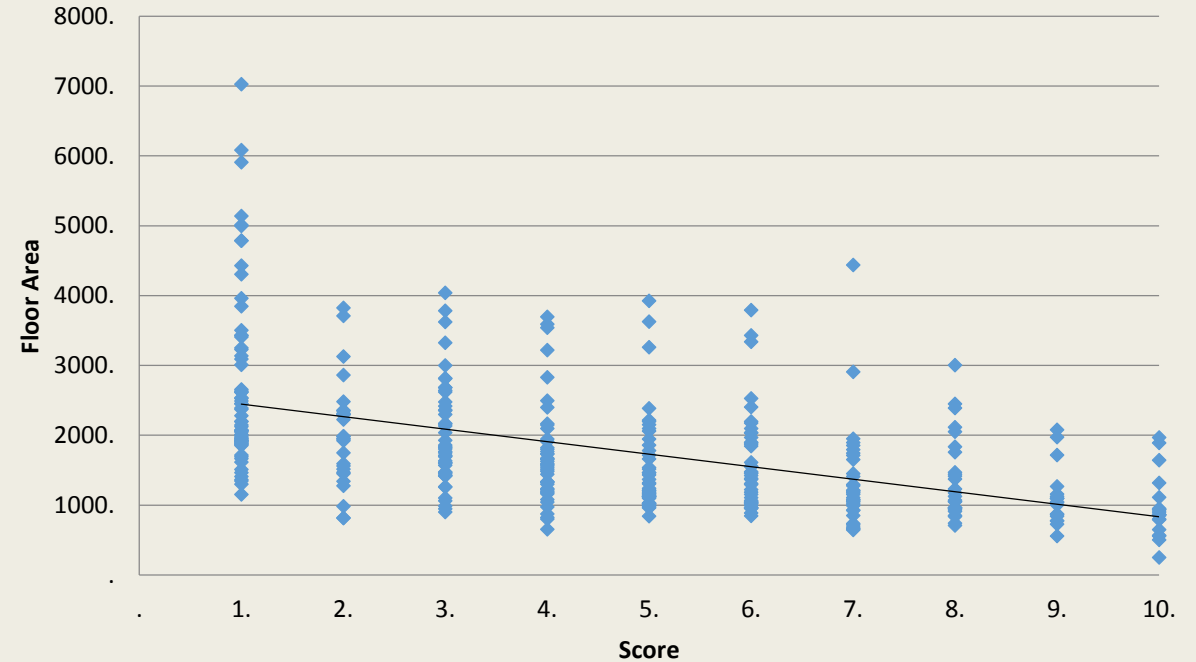


How Building Age & Size Affect Score

Initial Score vs Year Built



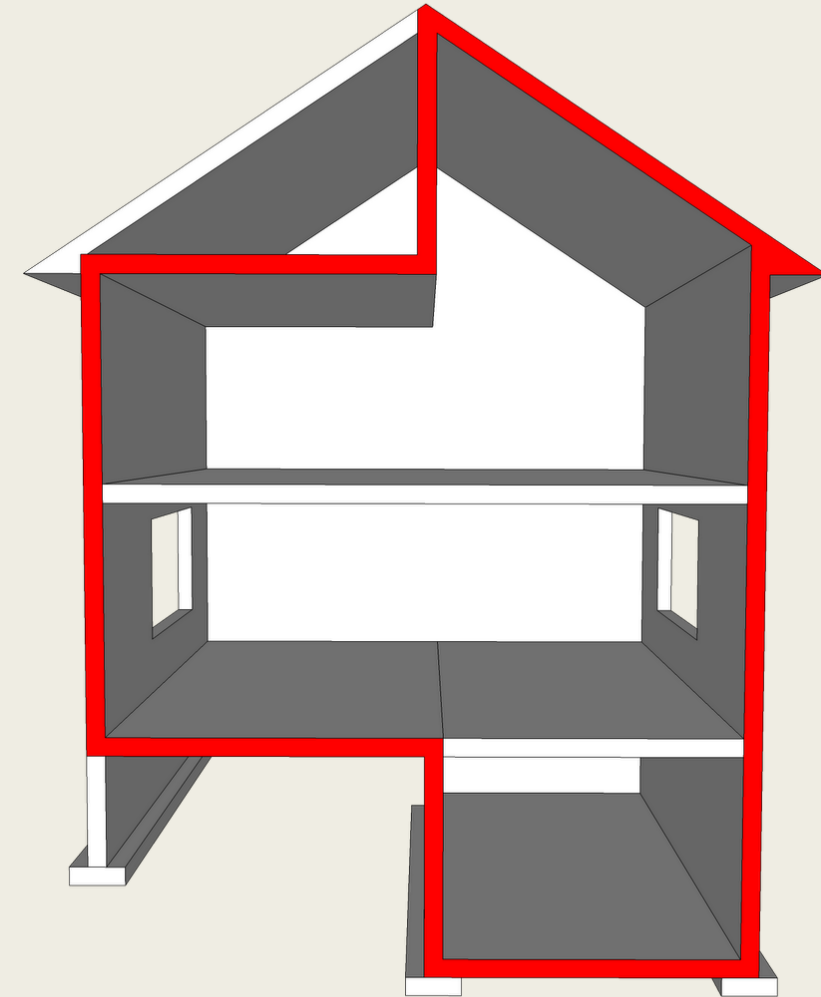
Initial Score vs Floor Area



- Building age has little to no bearing on a home's score
- Large homes score lower than small homes
 - *Especially influenced by window area*
- Small homes score across the 10-point scale

Berkeley Homes – Building Envelope

- Majority are poorly insulated
 - 33% *have no attic insulation*
 - 83% *have no floor insulation*
 - 50% *have no wall insulation*
- Very few have insulation up to code
 - 8% *have attic insulation to code*
 - 0% *have floor or wall insulation to code*
- 63% have single paned windows.



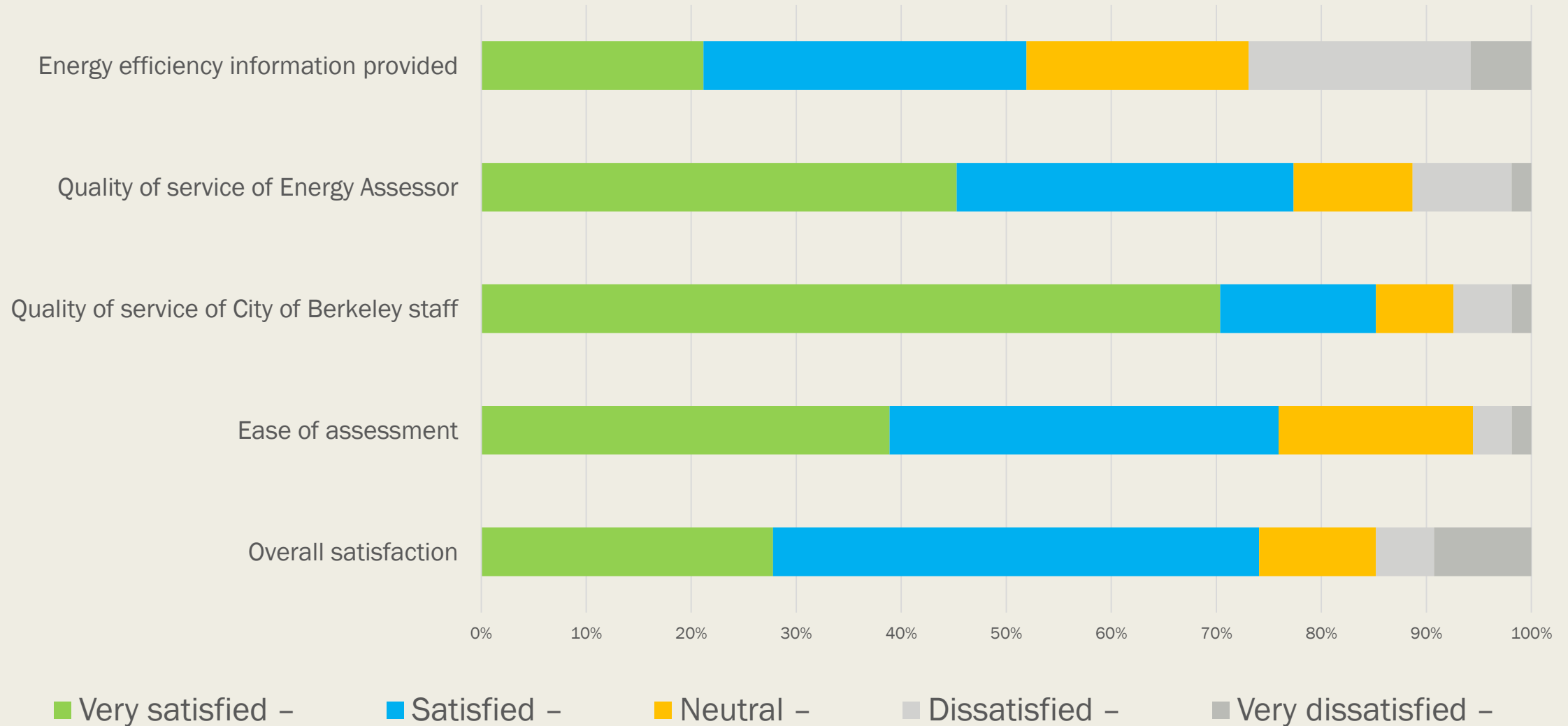
Berkeley Homes – HVAC

- Most houses are heated by natural gas
- Heating Efficiency: Annual Fuel Utilization Efficiency
 - *Code is 78% AFUE, best available 96% AFUE*
 - *Average: 76% AFUE*
 - *12% of houses are at or above 90% AFUE*
 - *64% are below code*
- 25% have natural gas wall furnaces
- 5% have AC



Feedback

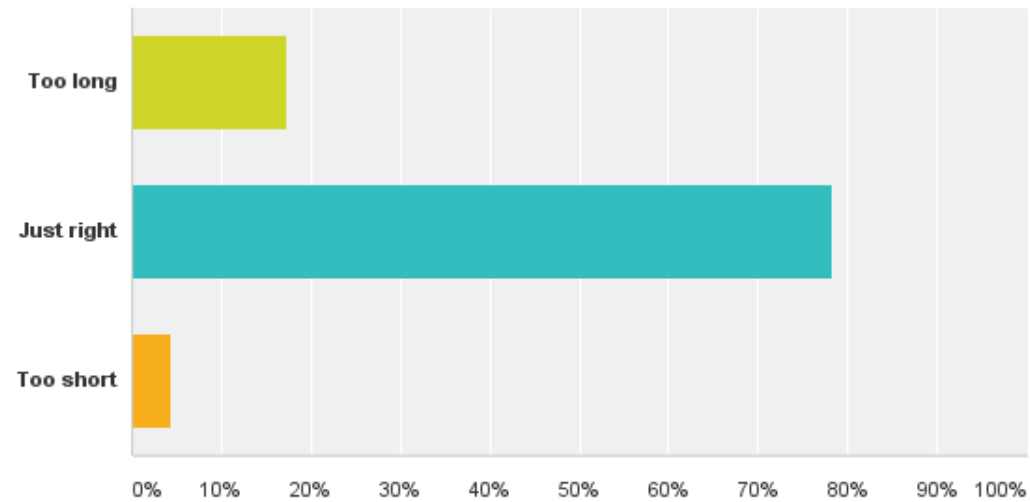
Please rate your experience based on the following:



Feedback

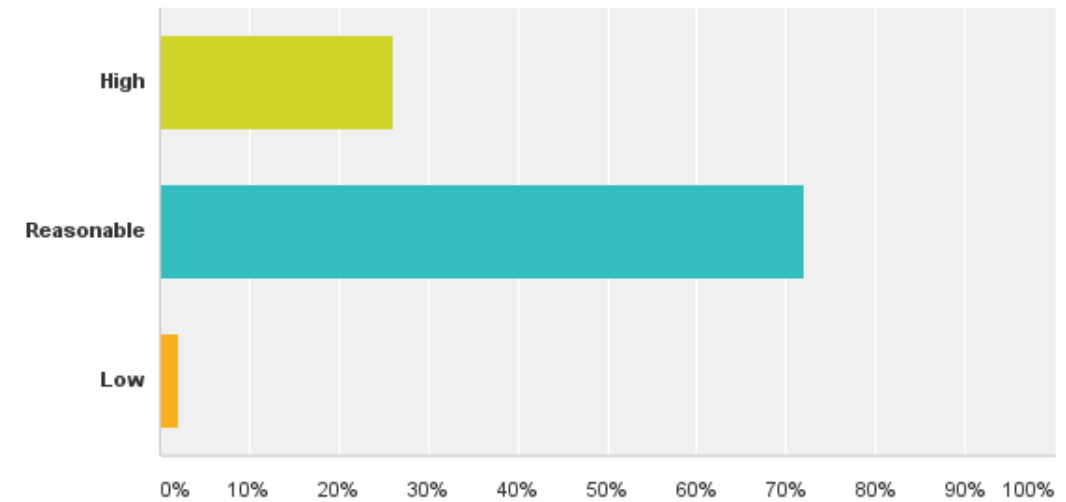
Q15 The appointment time was:

Answered: 46 Skipped: 9



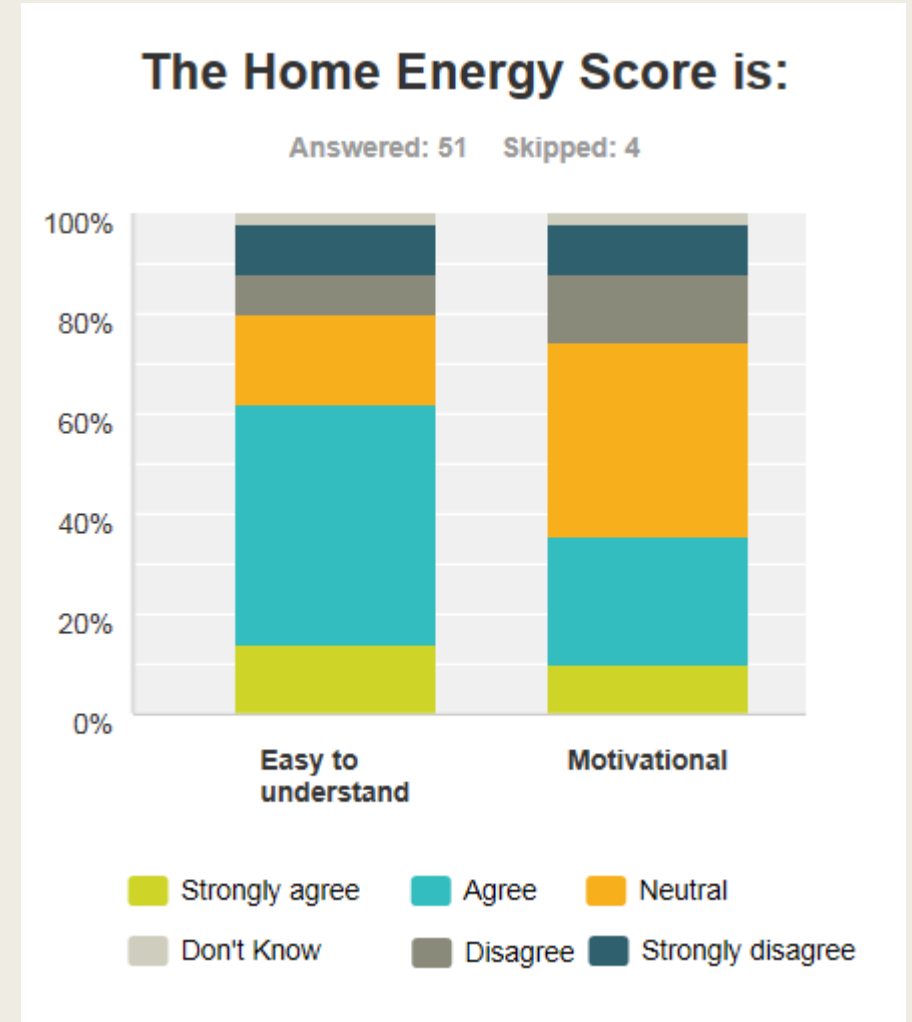
Q16 The cost of the Assessment was:

Answered: 50 Skipped: 5



Feedback

- 62% find HES easy to understand
- 35% find it motivational
 - *Priority area: how to motivate residents?*



Plans Moving Forward

- Reconvene the BESO Technical Advisory Committee
- HEScore Wish List:
 - *Include “upgrade” score*
 - *Account for PV in Score, coming 2017*
- Increase conversions from HEScore to Energy Upgrade
- Measure conversions
 - *Monthly Energy Upgrade California participation*
 - *PACE – Property Assessed Clean Energy loans*
 - *Building Permits*
 - *Community-wide consumption data*

Questions?